In the Claims

Please amend the claims of the Application as follows:

1. (Presently Amended) A method of autocalibrating a single-photon detector arranged to detect weak photon pulses in a quantum key distribution (QKD) system, comprising:

a) performing a detector gate scan by sending a detector gate pulse to the single-photon detector and varying an arrival time T of the detector gate pulse over a first select timing range R1 to determine an optimal arrival time T_{MAX} that corresponds to a maximum number of photon counts N_{MAX} from the single-photon detector by detecting the weak photon pulses; and

b) performing detector gate dithering of the detector gate pulse by varying the arrival time T over a second select timing range R2 surrounding optimal arrival time T_{MAX} to maintain the photon count at ~~a~~ the maximum ~~value~~ number of photon counts .

2. (Original) The method of claim 1, including:
terminating the detector gate dithering and performing another detector gate scan.

3. Canceled

4. (Presently Amended) The method of claim 1, wherein performing the detector gate scan includes varying a detector gate pulse width W over a first range of pulse widths RW1 to establish an optimal detector gate pulse width W_{MAX}.

5. (Presently Amended) The method of claim 4, wherein performing detector gate dithering includes varying the detector gate pulse width W over a second range of pulse widths RW2 < RW1 to maintain an optimal pulse width.

6. (Presently Amended) A computer-readable medium having instructions embodied therein to direct a computer in a quantum key distribution (QKD) system to execute instructions to perform the following method of performing autocalibration of a single-

photon detector arranged to detect weak photon pulses in the QKD system:

a) sending a detector gate pulse to the single-photon detector and varying an arrival time T of the detector gate pulse over a first timing range R1 to determine an optimal arrival time T_{MAX} that corresponds to a maximum number of photon counts N_{MAX} from the single-photon detector; and

b) dithering the detector gate pulse by varying the arrival time T over a second ~~select~~ timing range R2 surrounding optimal arrival time T_{MAX} to maintain the number of photon counts at either said maximum number of photon counts N_{MAX} or a new maximum ~~value~~ number of photon counts N'_{MAX}.

7. (Presently Amended) A method of operating a quantum key distribution (QKD) system having a single-photon detector operably coupled to a controller, comprising:

sending weak photon pulses between encoding stations in the QKD system;

performing a first detector gate scan by sending ~~a detector gate pulse,~~ from the controller to the single-photon detector, a detector gate pulse having an arrival time, including varying the arrival time over a first range of detector gate pulse arrival times ~~T~~ to establish a first optimal arrival time T_{MAX} corresponding to a first maximum number of photon counts N_{MAX} ~~from~~ determined by detecting said weak photon pulses by the single-photon detector;

terminating the first detector gate scan when the first optimal arrival time T_{MAX} is established; and

performing a first detector gate dither by ~~altering~~ varying the arrival time ~~T~~ over a second range of detector gate pulse arrival times ~~R2~~ about the first optimal arrival time T_{MAX} to maintain either the first maximum number of photon counts N_{MAX} or a ~~different~~ second maximum number of photon counts N'_{MAX}, wherein the second range of detector gate pulse arrival times is within the first range of detector gate arrival times ~~over the range R2~~.

8. (Presently Amended) The method of claim 7, wherein performing the first detector gate dither results in a ~~new~~ second optimal arrival time T'_{MAX} different from the first optimal arrival time T_{MAX}.

9. (Presently Amended) The method of claim 7, further including:
terminating the performing of ~~a~~ the first detector gate dither;
performing a second detector gate scan;
terminating the second detector gate scan; and
performing a second detector gate dither.

10. (Original) The method of claim 7, further including terminating and repeating the first detector gate dither periodically so as to perform a series of detector gate dithers.

11. (Presently Amended) A computer-readable medium having instructions embodied therein to direct a computer in a quantum key distribution (QKD) system to execute instructions to perform the following method of autocalibrating a single-photon detector arranged to detect photons in the QKD system:

sending weak photon pulses between encoding stations in the QKD system;
performing a first detector gate scan by sending ~~a detector gate pulse~~ , from ~~the~~ a controller to the detector, a detector gate pulse having an arrival time, including varying the arrival time over a first range of detector gate pulse arrival times ~~T~~ to establish a first optimal arrival time T_{MAX} corresponding to a first maximum number of photon counts N_{MAX} ~~from~~ determined by detecting said weak photon pulses by the single-photon detector;

terminating the first detector gate scan when the first optimal photon count ~~T_{MAX}~~ N_{MAX} is established; and

performing a first detector gate dither by ~~altering~~ varying the arrival time ~~T~~ over a second range of detector gate pulse arrival times ~~R2~~ about the first optimal arrival time T_{MAX} to maintain either the first maximum number of photon counts N_{MAX} or a ~~different~~ second maximum number of photon counts N'_{MAX} , wherein the second range of detector gate pulse arrival times is within the first range of detector gate arrival times ~~over the range R2~~.

12. (Presently Amended) A method of autocalibrating a single-photon detector in a quantum key distribution (QKD) system having a controller, comprising:

sending weak photon pulses between encoding stations in the QKD system;
performing a first detector gate scan to determine an optimum arrival time of a

detector gate pulse sent from a controller to the single-photon detector;

terminating the first detector gate scan; and

periodically performing a first detector gate dither to maintain a maximum number of photon counts from the single-photon detector.

13. (Previously Amended) The method of claim 11, further including:

terminating the first detector gate dither; and

performing a second detector gate scan.

14. (Presently Amended) A method of performing photon detector autocalibration in quantum key distribution (QKD) system having a single-photon detector coupled to a controller adapted to generate a detector gate pulse having a corresponding arrival time at the single-photon detector , the method comprising:

performing a detector gate scan to establish an optimum arrival time of ~~a~~ the detector gate pulse that corresponds with a first maximum number of photon counts of weak photon pulses detected by ~~from~~ the single-photon detector;

terminating the detector gate scan; and

performing a detector gate dither process by varying the detector gate pulse arrival time ~~of the detector gate pulse~~ around the optimal ~~value of the~~ arrival time to ~~provide minor adjustments to~~ adjust the arrival time to ensure that the single-photon detector produces ~~a~~ either the maximum number of photon counts or a second maximum number of photon counts when detecting the weak photon pulses.

15. (Previously Added) The method of claim 1, further including performing the detector gate scan and detector gate dithering multiple times during operation of the QKD system.

16. (Presently Amended) The computer-readable medium of claim 6, wherein the method further includes performing acts a) and b) ~~the detector gate scan and detector gate dithering~~ multiple times during operation of the QKD system.

17. (Presently Amended) The computer-readable medium of claim 6, wherein the method further includes varying a detector gate pulse width W over a range of pulse widths to establish an optimal detector gate pulse width W_{MAX} for the single-photon detector.

18. (Presently Amended) The method of claim 7, further including varying a detector gate pulse width W over a range of pulse widths to establish an optimal detector gate pulse width W_{MAX} for the single-photon detector.

19. (Presently Amended) The method of claim 12, further including varying a detector gate pulse width W over a range of pulse widths to establish an optimal detector gate pulse width W_{MAX} for the single-photon detector.

20. (Presently Amended) The method of claim 14, further including varying a detector gate pulse width W over a range of pulse widths to establish an optimal detector gate pulse width W_{MAX} for the single-photon detector.